

## ABSTRACT

### METHOD AND APPARATUS FOR INITIALIZING MODEM COMMUNICATIONS

5           The present invention provides a method and apparatus for demodulating data received over a communication medium carrying a transmission having multiple pilot tones with pilot data modulated thereon and message tones with message data modulated thereon and with the pilot tones and message tones frequency division multiplexed with respect to one another. In an embodiment of the invention the

10 communication protocol utilized for modulation and demodulation is discrete multi tone (DMT). The invention allows message processing and equalizer training to proceed in parallel before equalizer training tables have been completed thus reducing the time associated with modem initialization. The apparatus in one embodiment of the invention includes on the receive path of a DMT or other multi-tone modem, a fast

15 Fourier transform engine (FFT), a message processor, and a decoder. The FFT converts the received data from a time domain to a frequency domain. The received data in the frequency domain includes successive sets of pilot tones together with message tones. The message processor selects pairs of message and pilot tones proximate to one another in the frequency domain in each set of pilot tones and

20 message tones. The message tone in each pair is then equalized with the pilot tone in the pair to substantially remove frequency dependent phase shifts imparted by the communication medium to the message tone. The equalized message tone is then decoded in the decoder to the corresponding specific set of message data which it represents.

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